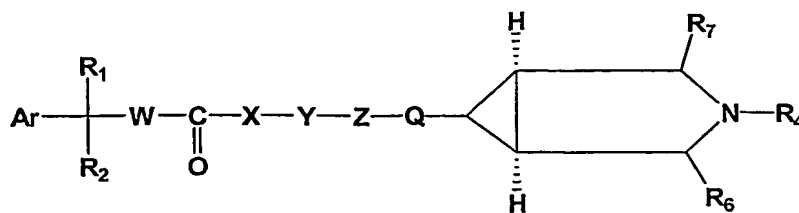


We Claim:

1. A compound having the structure of Formula I

**Formula I**

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxy, nitro, lower alkoxy (C₁-C₄), lower perhalo alkoxy (C₁-C₄), unsubstituted amino, N-lower alkyl (C₁-C₄) amino or N-lower alkyl (C₁-C₄) amino carbonyl;

R₁ represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy, carbamoyl or halogen (fluorine, chlorine, bromine or iodine);

R₂ represents a C₃-C₇ cycloalkyl ring in which from 1 to 4 hydrogen atoms are substituted with fluorine atoms, or sulphonamide derivatives;

W represents (CH₂)_p, where p represents 0 or 1;

X represents oxygen, sulphur, nitrogen or no atom;

Y represents CHR₅CO wherein R₅ represents hydrogen or methyl or (CH₂)_q wherein q represents 0 to 4;

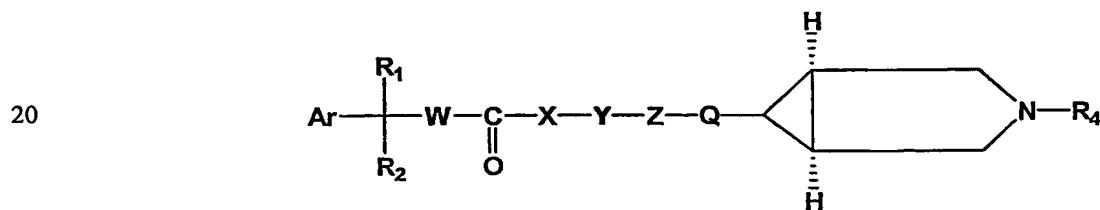
Z represents oxygen, sulphur or NR₁₀, wherein R₁₀ represents hydrogen or C₁₋₆ alkyl;

Q represents $(CH_2)_n$ wherein n represents 1 to 4, or CHR_8 wherein R_8 represents H, OH, C_{1-6} , alkyl, alkenyl alkoxy or CH_2CHR_9 wherein R_9 represents H, OH, lower alkyl (C_1-C_4) or lower alkoxy (C_1-C_4);

5 R_6 and R_7 are independently selected from H, CH_3 , $COOH$, $CONH_2$, NH_2 or CH_2NH_2 ; and

R_4 represents a C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxyl, nitro, lower alkoxy, carbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4) or N-lower alkylamino carbonyl (C_1-C_4).

2. A compound having the structure of Formula II



Formula II

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three

substituents independently selected from lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxy, nitro, lower alkoxy (C₁-C₄), lower perhalo alkoxy (C₁-C₄), unsubstituted amino, N-lower alkyl (C₁-C₄) amino or N-lower alkyl (C₁-C₄) amino carbonyl;

5 R₁ represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy, carbamoyl or halogen (fluorine, chlorine, bromine or iodine);

R₂ represents a C₃-C₇ cycloalkyl ring in which from 1 to 4 hydrogen atoms are substituted with fluorine atoms, or sulphonamide derivatives;

W represents (CH₂)_p, where p represents 0 or 1;

10 X represents oxygen, sulphur, nitrogen or no atom;

Y represents CHR₅CO wherein R₅ represents hydrogen or methyl or (CH₂)_q wherein q represents 0 to 4;

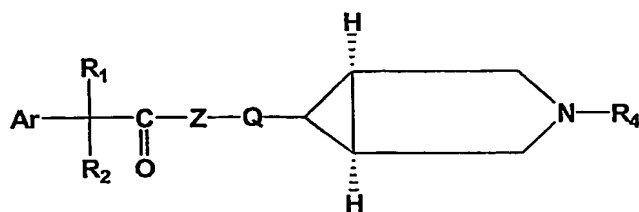
Z represents oxygen, sulphur or NR₁₀, wherein R₁₀ represents hydrogen or C₁₋₆ alkyl;

15 Q represents (CH₂)_n wherein n represents 1 to 4, or CHR₈ wherein R₈ represents H, OH, C₁₋₆, alkyl, alkenyl alkoxy or CH₂CHR₉ wherein R₉ represents H, OH, lower alkyl (C₁-C₄) or lower alkoxy (C₁-C₄); and

20 R₄ represents a C₁-C₁₅ saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxyl, nitro, lower alkoxy carbonyl, halogen, lower alkoxy (C₁-C₄), lower perhaloalkoxy (C₁-C₄), unsubstituted amino, N-lower alkylamino (C₁-C₄) or N-lower alkylamino carbonyl (C₁-C₄).

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3. A compound having the structure of Formula III



Formula III

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, distereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxy, nitro, lower alkoxy (C₁-C₄), lower perhalo alkoxy (C₁-C₄), unsubstituted amino, N-lower alkyl (C₁-C₄) amino or N-lower alkyl (C₁-C₄) amino carbonyl;

R₁ represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy, carbamoyl or halogen (fluorine, chlorine, bromine or iodine);

R₂ represents a C₃-C₇ cycloalkyl ring in which from 1 to 4 hydrogen atoms are substituted with fluorine atoms, or sulphonamide derivatives;

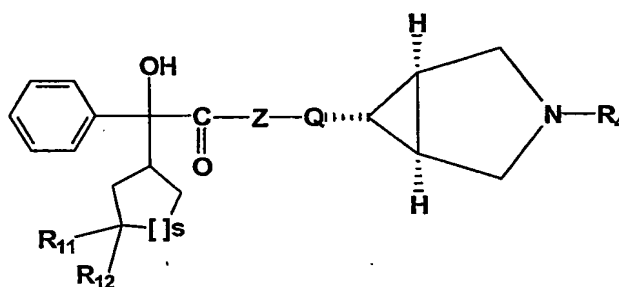
Z represents oxygen, sulphur or NR₁₀, wherein R₁₀ represents hydrogen or C₁₋₆ alkyl;

Q represents (CH₂)_n wherein n represents 1 to 4, or CHR₈ wherein R₈ represents H, OH, C₁₋₆, alkyl, alkenyl alkoxy or CH₂CHR₉ wherein R₉ represents H, OH, lower alkyl (C₁-C₄) or lower alkoxy (C₁-C₄); and

R₄ represents a C₁-C₁₅ saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl,

heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxyl, nitro, lower alkoxy, carbonyl, halogen, lower alkoxy (C₁-C₄), lower perhaloalkoxy (C₁-C₄), unsubstituted amino, N-lower alkylamino (C₁-C₄) or N-lower alkylamino carbonyl (C₁-C₄).

4. A compound having the structure of Formula IV



Formula IV

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, N-oxides, prodrugs or metabolites, wherein R₁₁ is hydrogen or fluoro, R₁₂ is fluoro or sulphonamide derivatives and s represents 1 to 2;

R₄ represents a C₁-C₁₅ saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxyl, nitro, lower alkoxy, carbonyl, halogen, lower alkoxy (C₁-C₄), lower perhaloalkoxy (C₁-

C₄), unsubstituted amino, N-lower alkylamino (C₁-C₄) or N-lower alkylamino carbonyl (C₁-C₄);

Z represents oxygen, sulphur or NR₁₀, wherein R₁₀ represents hydrogen or C₁₋₆ alkyl; and

Q represents (CH₂)_n wherein n represents 1 to 4, or CHR₈ wherein R₈ represents H, OH, C₁₋₆, alkyl, alkenyl alkoxy or CH₂CHR₉ wherein R₉ represents H, OH, lower alkyl (C₁-C₄) or lower alkoxy (C₁-C₄).

5. A compound selected from the group consisting of:

(2R)- (1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S)-3,3-difluorocyclopentyl]-2- hydroxy-2-phenylacetamide (Compound No.1A)

(2R)-(1 α ,5 α ,6 α)- N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S)-3,3-difluorocyclopentyl]-2- hydroxy-2-phenylacetamide (Compound No.1B)

(2R)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S, 3R or 3S)-3-fluorocyclopentyl]-2- hydroxy-2-phenylacetamide (Compound No.2)

(2Ror 2S)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S)-3,3-difluorocyclopentyl]-2- hydroxy-2-phenylacetamide (Compound No.3)

(2R or 2S)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S, 3R or 3S)-3-fluorocyclopentyl]-2-hydroxy-2-phenylacetamide (Compound No.4)

(2R)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S, 3R or 3S)-3-phenylacetyl amino cyclopentyl]-2- hydroxy-2-phenylacetamide (Compound No. 5)

(2R)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S, 3R or 3S)-3-(4-nitrophenyl) sulphonylaminocyclopentyl]-2- hydroxy-2-phenylacetamide (Compound No.6)

(2R)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1Ror 1S, 3R or 3S)-3-phenylsulphonyl amino cyclopentyl]-2- hydroxy-2-phenylacetamide (Compound No.7)

(2R)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S, 3R or 3S)-3-benzyloxyacetylaminocyclopentyl]-2-hydroxy-2-phenylacetamide (Compound No.8)

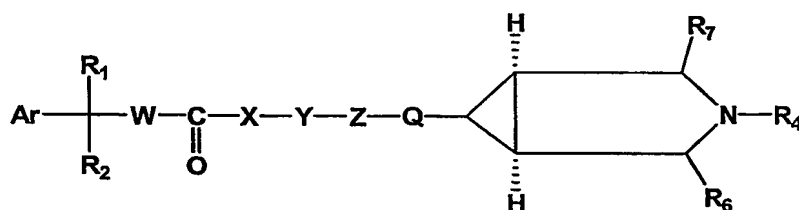
5 (2R)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S, 3R or 3S)-3-(4-methoxyphenyl) sulphonylaminocyclopentyl]-2-hydroxy-2-phenylacetamide (Compound No.9)

10 (2R)-(1 α ,5 α ,6 α)-N-[3-benzyl-3-azabicyclo[3.1.0]hexyl-6-(aminomethyl)-yl]-2-[(1R or 1S, 3R or 3S)-3-(4-bromophenyl)sulphonylamino cyclopentyl]-2-hydroxy-2-phenylacetamide (Compound No.10)

6. A pharmaceutical composition comprising a therapeutically effective amount of a compound as defined in claims 1, 2, 3, 4 or 5 together with
15 pharmaceutically acceptable carriers, excipients or diluents.

7. A method for treatment or prophylaxis of an animal or human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through muscarinic receptors, comprising administering to said animal or human, a
20 therapeutically effective amount of a compound having the structure of Formula I

25



30

Formula I

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, or metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three
35 substituents independently selected from lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxy, nitro, lower alkoxy (C₁-C₄), lower perhalo

alkoxy (C₁-C₄), unsubstituted amino, N-lower alkyl (C₁-C₄) amino or N-lower alkyl (C₁-C₄) amino carbonyl;

R₁ represents a hydrogen, hydroxyhydroxymethyl, amino, alkoxy, carbamoyl or halogen (fluorine, chlorine, bromine and iodine);

5 R₂ represents a C₃-C₇ cycloalkyl ring in which from 1 to 4 hydrogen atoms are substituted with fluorine atoms, or sulphonamide derivatives;

W represents (CH₂)_p, where p represents 0 to 1;

X represents an oxygen, sulphur, nitrogen or no atom;

10 Y represents CHR₅CO wherein R₅ represents hydrogen or methyl or (CH₂)_q wherein q represents 0 to 4;

Z represents oxygen, sulphur, NR₁₀, wherein R₁₀ represents hydrogen or C₁₋₆ alkyl;

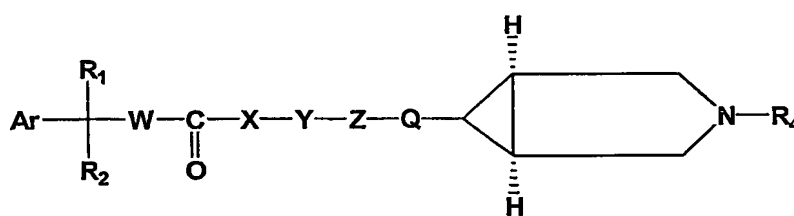
15 Q represents (CH₂)_n wherein n represents 1 to 4, or CHR₈ wherein R₈ represents H, OH, C₁₋₆, alkyl, alkenyl alkoxy or CH₂CHR₉ wherein R₉ represents H, OH, lower alkyl (C₁-C₄) or lower alkoxy (C₁-C₄);

R₆ and R₇ are independently selected from H, CH₃, COOH, CONH₂, NH₂ or CH₂NH₂; and

20 R₄ represents a C₁-C₁₅ saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, 25 arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxyl, nitro, lower alkoxy carbonyl, halogen, lower alkoxy (C₁-C₄), lower perhaloalkoxy (C₁-

C₄), unsubstituted amino, N-lower alkylamino (C₁-C₄) or N-lower alkylamino carbonyl (C₁-C₄).

8. A method for treatment or prophylaxis of an animal or human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through the muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula II



Formula II

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxy, nitro, lower alkoxy (C₁-C₄), lower perhalo alkoxy (C₁-C₄), unsubstituted amino, N-lower alkyl (C₁-C₄) amino or N-lower alkyl (C₁-C₄) amino carbonyl;

R₁ represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy, carbamoyl or halogen (fluorine, chlorine, bromine or iodine);

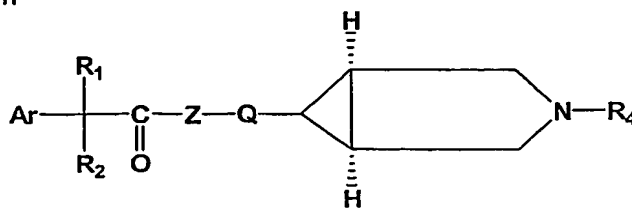
R₂ represents a C₃-C₇ cycloalkyl ring in which from 1 to 4 hydrogen atoms are substituted with fluorine atoms, or sulphonamide derivatives;

W represents (CH₂)_p, where p represents 0 or 1;

- X represents oxygen, sulphur, nitrogen or no atom;
- Y represents CHR_5CO wherein R_5 represents hydrogen or methyl or $(\text{CH}_2)_q$ wherein q represents 0 to 4;
- Z represents oxygen, sulphur or NR_{10} , wherein R_{10} represents hydrogen or C_{1-6} alkyl;
- Q represents $(\text{CH}_2)_n$ wherein n represents 1 to 4, or CHR_8 wherein R_8 represents H, OH, C_{1-6} , alkyl, alkenyl alkoxy or CH_2CHR_9 wherein R_9 represents H, OH, lower alkyl ($\text{C}_1\text{-C}_4$) or lower alkoxy ($\text{C}_1\text{-C}_4$); and

R_4 represents a $\text{C}_1\text{-C}_{15}$ saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl ($\text{C}_1\text{-C}_4$), lower perhalo alkyl ($\text{C}_1\text{-C}_4$), cyano, hydroxyl, nitro, lower alkoxy carbonyl, halogen, lower alkoxy ($\text{C}_1\text{-C}_4$), lower perhaloalkoxy ($\text{C}_1\text{-C}_4$), unsubstituted amino, N-lower alkylamino ($\text{C}_1\text{-C}_4$) or N-lower alkylamino carbonyl ($\text{C}_1\text{-C}_4$).

9. A method for treatment or prophylaxis of an animal or human suffering from a disease or disorder of the respiratory, urinary, and gastrointestinal systems, wherein the disease or disorder is mediated through the muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula III



Formula III

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, distereomers, N-oxides, polymorphs, prodrugs, metabolites wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxy, nitro, lower alkoxy (C₁-C₄), lower perhalo alkoxy (C₁-C₄), unsubstituted amino, N-lower alkyl (C₁-C₄) amino or N-lower alkyl (C₁-C₄) amino carbonyl;

R₁ represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy, carbamoyl or halogen (fluorine, chlorine, bromine or iodine);

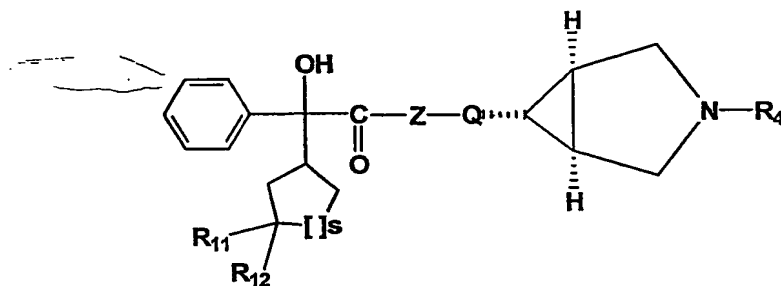
R₂ represents a C₃-C₇ cycloalkyl ring in which from 1 to 4 hydrogen atoms are substituted with fluorine atoms, or sulphonamide derivatives;

Z represents oxygen, sulphur or NR₁₀, wherein R₁₀ represents hydrogen or C₁₋₆ alkyl;

Q represents (CH₂)_n wherein n represents 1 to 4, or CHR₈ wherein R₈ represents H, OH, C₁₋₆, alkyl, alkenyl alkoxy or CH₂CHR₉ wherein R₉ represents H, OH, lower alkyl (C₁-C₄) or lower alkoxy (C₁-C₄); and

R₄ represents a C₁-C₁₅ saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxyl, nitro, lower alkoxycarbonyl, halogen, lower alkoxy (C₁-C₄), lower perhaloalkoxy (C₁-C₄), unsubstituted amino, N-lower alkylamino (C₁-C₄) or N-lower alkylamino carbonyl (C₁-C₄).

10. A method for treatment or prophylaxis of an animal or human suffering from a disease or disorder of the respiratory, urinary or gastrointestinal systems, wherein the disease or disorder is mediated through the muscarinic receptors, comprising administering to said animal or human, a therapeutically effective amount of a compound having the structure of Formula IV



Formula IV

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, N-oxides, prodrugs or metabolites, wherein

R_{11} is hydrogen or fluoro, R_{12} is fluoro or sulphonamide derivatives and s represents 1 to 2;

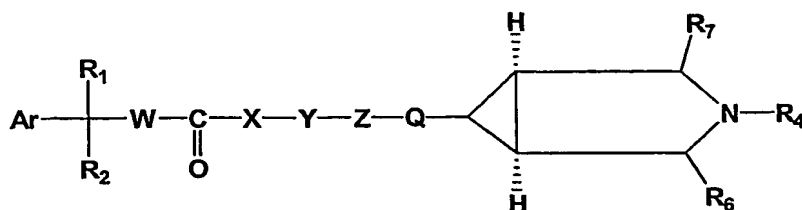
R_4 represents a C_1 - C_{15} saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C_1 - C_4), lower perhalo alkyl (C_1 - C_4), cyano, hydroxyl, nitro, lower alkoxy carbonyl, halogen, lower alkoxy (C_1 - C_4), lower perhaloalkoxy (C_1 - C_4), unsubstituted amino, N-lower alkylamino (C_1 - C_4) or N-lower alkylamino carbonyl (C_1 - C_4);

Z represents oxygen, sulphur or NR_{10} , wherein R_{10} represents hydrogen or C_{1-6} alkyl; and

Q represents $(CH_2)_n$ wherein n represents 1 to 4, or CHR_8 wherein R_8 represents H, OH, C_{1-6} , alkyl, alkenyl alkoxy or CH_2CHR_9 wherein R_9 represents H, OH, lower alkyl (C_1-C_4) or lower alkoxy (C_1-C_4).

- 5 11. The method according to claim 7 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestinal hyperkinesis.
- 10 12. The method according to claim 8 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes or gastrointestinal hyperkinesis.
- 15 13. The method according to claim 9 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS) bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestinal hyperkinesis.
- 20 14. The method according to claim 10 the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestinal hyperkinesis.
- 25 15. The method for treatment or prophylaxis of an animal or human suffering from a disease or disorder of the respiratory, urinary and gastrointestinal systems, wherein the disease or disorder is mediated through the muscarinic receptors, comprising administering to said animal or human a therapeutically effective amount of the pharmaceutical composition
- 30 according to claim 6.

16. The method according to claim 15 wherein the disease or disorder is urinary incontinence, lower urinary tract symptoms (LUTS), bronchial asthma, chronic obstructive pulmonary disorders (COPD), pulmonary fibrosis, irritable bowel syndrome, obesity, diabetes and gastrointestinal hyperkinesis.
17. A process of preparing a compound of Formula I



Formula I

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs, metabolites, wherein

Ar represents an aryl or a heteroaryl ring having 1-2 hetero atoms selected from the group consisting of oxygen, sulphur and nitrogen atoms, the aryl or heteroaryl rings may be unsubstituted or substituted by one to three substituents independently selected from lower alkyl (C₁-C₄), lower perhalo alkyl (C₁-C₄), cyano, hydroxy, nitro, lower alkoxy (C₁-C₄), lower perhalo alkoxy (C₁-C₄), unsubstituted amino, N-lower alkyl (C₁-C₄) amino or N-lower alkyl (C₁-C₄) amino carbonyl;

R₁ represents a hydrogen, hydroxy, hydroxymethyl, amino, alkoxy, carbamoyl or halogen (fluorine, chlorine, bromine and iodine);

R₂ represents a C₃-C₇ cycloalkyl ring in which from 1 to 4 hydrogen atoms are substituted with fluorine atoms, or sulphonamide derivatives;

W represents (CH₂)_p, where p represents 0 to 1;

X represents an oxygen, sulphur, nitrogen or no atom;

Y represents CHR_5CO wherein R_5 represents hydrogen or methyl or $(\text{CH}_2)_q$ wherein q represents 0 to 4;

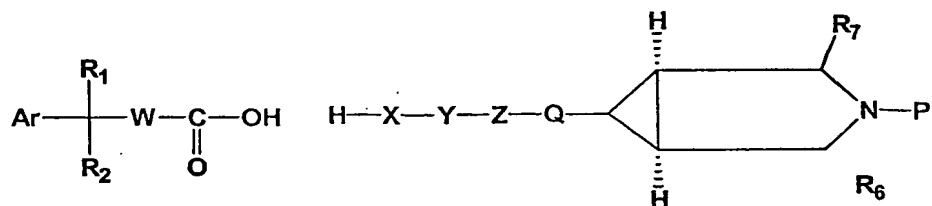
Z represents oxygen, sulphur, NR_{10} , wherein R_{10} represents hydrogen or C_{1-6} alkyl;

Q represents $(\text{CH}_2)_n$ wherein n represents 1 to 4, or CHR_8 wherein R_8 represents H, OH, C_{1-6} , alkyl, alkenyl alkoxy or CH_2CHR_9 wherein R_9 represents H, OH, lower alkyl ($\text{C}_1\text{-C}_4$) or lower alkoxy ($\text{C}_1\text{-C}_4$);

R_6 and R_7 are independently selected from H, CH_3 , COOH , CONH_2 , NH_2 or CH_2NH_2 ; and

R_4 represents a $\text{C}_1\text{-C}_{15}$ saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from the group consisting of nitrogen, oxygen and sulphur atoms with an option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl ($\text{C}_1\text{-C}_4$), lower perhalo alkyl ($\text{C}_1\text{-C}_4$), cyano, hydroxyl, nitro, lower alkoxy, carbonyl, halogen, lower alkoxy ($\text{C}_1\text{-C}_4$), lower perhaloalkoxy ($\text{C}_1\text{-C}_4$), unsubstituted amino, N-lower alkylamino ($\text{C}_1\text{-C}_4$) or N-lower alkylamino carbonyl ($\text{C}_1\text{-C}_4$), comprising

(a) condensing a compound of Formula VI with a compound of Formula V

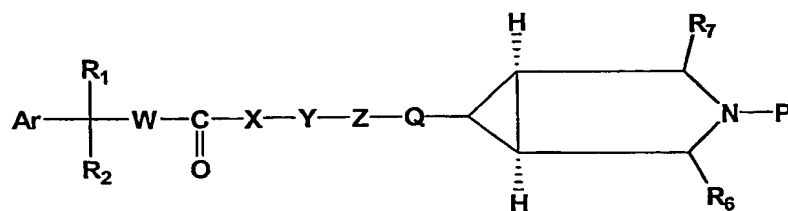


FORMULA VI

FORMULA V

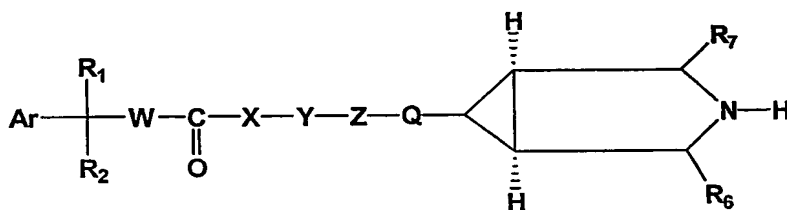
wherein Ar, R_1 , R_2 , W, X, Y, Z, Q, R_6 and R_7 have the same meanings as defined earlier for Formula I, to give a protected compound of Formula VII

wherein Ar, R₁, R₂, W, X, Y, Z, Q, R₆ and R₇ are the same as defined earlier and P is a protecting group for an amino group,



FORMULA VII

(b) deprotecting the compound of Formula VII in the presence of a deprotecting agent to give an unprotected intermediate of Formula VIII wherein Ar, R₁, R₂, W, X, Y, Z, Q, R₆ and R₇ are the same as defined earlier, and



FORMULA VIII

(c) the intermediate of Formula VIII is N-alkylated or benzylated with a suitable alkylating agent or benzylating agent to give a compound of Formula I.

18. The process according to claim 17 wherein P is any protecting group for an amino group and is selected from the group consisting of benzyl or t-butyloxy carbonyl groups.

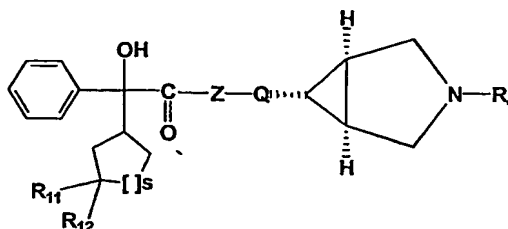
19. The process according to claim 17 wherein the reaction of a compound of Formula V with a compound of Formula VI to give a compound of Formula VII is carried out in the presence of a condensing agent which is selected from the group consisting of 1-(3-dimethylaminopropyl)-3-ethyl carbodiimide hydrochloride (EDC) and 1,8-diazabicyclo [5.4.0] undec-7-ene (DBU).

20. The process according to claim 17 wherein the reaction of a compound of Formula V with a compound of Formula VI to give a compound of Formula

VII is carried out in the presence of a suitable solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulphoxide, toluene and xylene.

21. The process according to claim 17 wherein the reaction of a compound of Formula V with a compound of Formula VI is carried out at about 0-140°C.
22. The process according to claim 17 wherein the deprotection of a compound of Formula VII to give a compound of Formula VIII is carried out with a deprotecting agent which is selected from the group consisting of palladium on carbon, trifluoroacetic acid (TFA) and hydrochloric acid.
23. The process according to claim 17 wherein the deprotection of a compound of Formula VII to give a compound of Formula VIII is carried out in a suitable organic solvent selected from the group consisting of methanol, ethanol, tetrahydrofuran and acetonitrile.
24. The process according to claim 17 wherein the N-alkylation or benzylation of a compound of Formula VIII to give a compound of Formula I is carried out with a suitable alkylating or benzylating agent, L-R₄, wherein L is any leaving group and R₄ is the same as defined earlier.
25. The process according to claim 24 wherein the leaving group is selected from the group consisting of halogen, O-mestyl and O-tosyl group.
26. The process according to claim 24 wherein the N-alkylation or N-benzylation of a compound of Formula VIII to give a compound of Formula I is carried out in a suitable organic solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulphoxide, tetrahydrofuran and acetonitrile.

27. A process for preparing a compound of Formula IV



FORMULA IV

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein

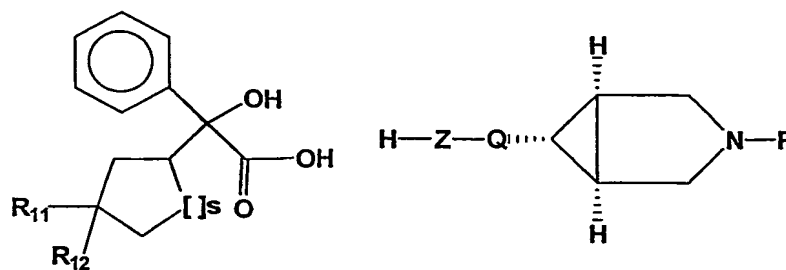
R_{11} is hydrogen or fluoro, R_{12} is fluoro or sulphonamide derivatives and s represents 1 to 2;

Z represents oxygen, sulphur, NR_{10} , wherein R_{10} represents hydrogen, C_{1-6} alkyl;

Q represents $(CH_2)_n$ wherein n represents 1 to 4, or CHR_8 wherein R_8 represents H, OH, C_{1-6} , alkyl, alkenyl alkoxy or CH_2CHR_9 wherein R_9 represents H, OH, lower alkyl (C_1-C_4) or lower alkoxy (C_1-C_4); and

R_4 represents a C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from a group consisting of nitrogen, oxygen and sulphur atoms with option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxyl, nitro, lower alkoxy carbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4), N-lower alkylamino carbonyl (C_1-C_4), comprising

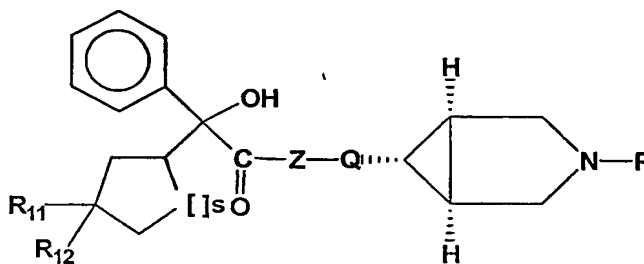
(a) condensing a compound of Formula IX with a compound of Formula X



FORMULA IX

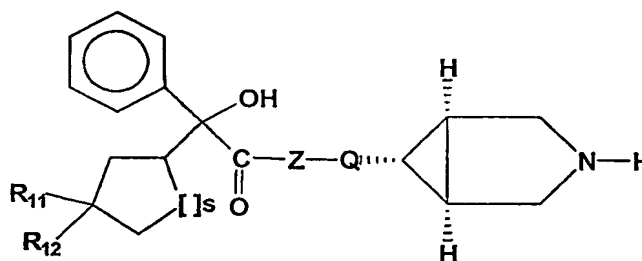
FORMULA X

where Z, Q, R₁₁, R₁₂ and s have the same meanings as defined earlier for Formula IV, to give a protected compound of Formula XI,



FORMULA XI

(b) deprotecting the compound of Formula XI in the presence of a deprotecting agent to give an unprotected intermediate of Formula XII where Z, Q, R₁₁, R₁₂, s have the same meanings as defined earlier, and

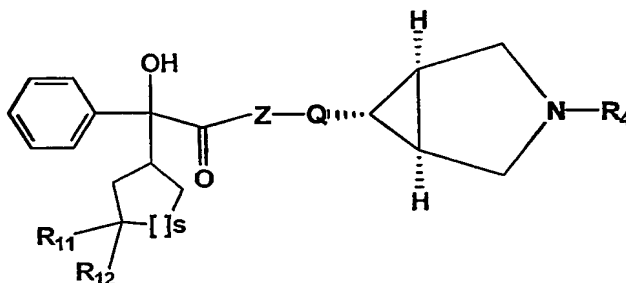


FORMULA XII

(c) the intermediate of Formula XII is N-alkylated or benzylated with a suitable alkylating or benzylating agent to give a compound of Formula IV wherein Z, Q, R₁₁, R₁₂, and s are the same as defined earlier.

28. The process according to claim 27 wherein P is a protecting group for an amino group and is selected from the group consisting of benzyl or t-butoxy carbonyl groups.
29. The process according to claim 27 wherein the reaction of a compound of Formula IX with a compound of Formula X to give a compound of Formula XI is carried out in the presence of a condensing agent which is selected from the group consisting of 1-(3-dimethyl aminopropyl)-3-ethylcarbodiimide hydrochloride (EDC) and 1,8-diazabicyclo [5.4.0] undec-7-ene (DBU).
30. The process according to claim 27 wherein the reaction of a compound of Formula IX with a compound of Formula X to give a compound of Formula XI is carried out in the presence of a suitable solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulphoxide, toluene and xylene.
31. The process according to claim 27 wherein the reaction of a compound of Formula IX with a compound of Formula X is carried out at about 0-140°C.
32. The process according to claim 27 wherein the deprotection of a compound of Formula XI to give a compound of Formula XII is carried out with a deprotecting agent which is selected from the group consisting of palladium on carbon, trifluoroacetic acid (TFA) and hydrochloric acid.
33. The process according to claim 27 wherein the deprotection of a compound of Formula XI to give a compound of Formula XII is carried out in a suitable organic solvent selected from the group consisting of methanol, ethanol, tetrahydrofuran and acetonitrile.
34. The process according to claim 27 wherein the N-alkylation or benzylation of a compound of Formula XII to give a compound of Formula IV is carried out with a suitable alkylating or benzylating agent, L-R₄, wherein L is any leaving group and R₄ is the same as defined earlier.

35. The process according to claim 34 wherein the leaving group is selected from the group consisting of halogen, O-mestyl and O-tosyl group.
36. The process according to claim 34 wherein the N-alkylation or N-benzylation of a compound of Formula XII to give a compound of Formula IV is carried out in a suitable organic solvent selected from the group consisting of N,N-dimethyl formamide, dimethylsulphoxide, tetrahydrofuran and acetonitrile.
37. A process for preparing a compound of Formula IV



FORMULA IV

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein

R_{11} is H or F, R_{12} = F or substituted sulfonamide derivatives and s represents 1 to 2;

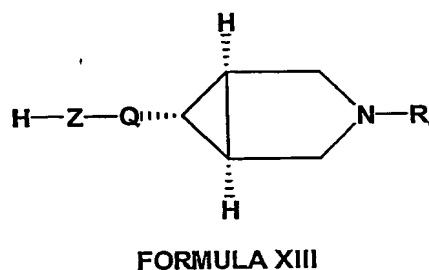
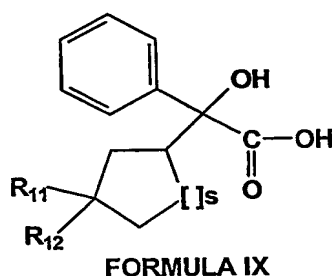
Z represents oxygen, sulphur, NR_{10} , wherein R_{10} represents hydrogen, C_{1-6} alkyl;

Q represents $(CH_2)_n$ wherein n represents 1 to 4, or CHR_8 wherein R_8 represents H, OH, C_{1-6} , alkyl, alkenyl alkoxy or CH_2CHR_9 wherein R_9 represents H, OH, lower alkyl (C_1-C_4) or lower alkoxy (C_1-C_4); and

R_4 represents a C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the

group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from a group consisting of nitrogen, oxygen and sulphur atoms with option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxyl, nitro, lower alkoxy, carbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted amino, N-lower alkylamino (C_1-C_4), N-lower alkylamino carbonyl (C_1-C_4), comprising

condensing a compound of Formula IX with a compound of Formula XIII



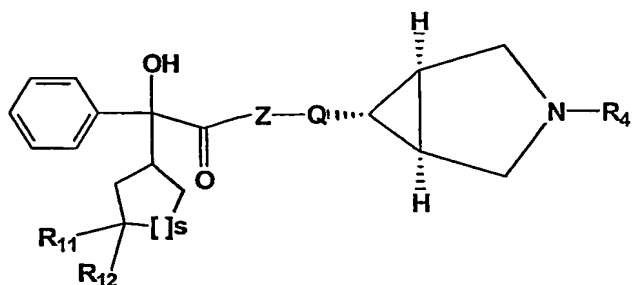
where Z, Q, R_4 , s have the same meanings as defined earlier for Formula IV to give a compound of Formula IV.

38. The process according to claim 37, wherein the reaction of a compound of Formula XIII with a compound of Formula IX is carried out in the presence of a condensing agent which is selected from the group consisting of 1-(3-dimethylaminopropyl)-3-ethyl carbodiimide hydrochloride (EDC) and 1,8-diazabicyclo [5.4.0]-undec-7-ene (DBU).

39. The process according to claim 37 wherein the reaction of a compound of Formula XIII with a compound of Formula IX is carried out in the presence of a suitable solvent selected from the group consisting of N, N-dimethylformamide, dimethylsulfoxide, toluene and xylene.

40. The process according to claim 37 wherein the reaction of a compound of Formula XIII with a compound of Formula IX is carried out at about 0-140°C.

41. A process for preparing a compound of Formula IV



FORMULA IV

and its pharmaceutically acceptable salts, pharmaceutically acceptable solvates, esters, enantiomers, diastereomers, N-oxides, polymorphs, prodrugs or metabolites, wherein

R_{11} is H or F, R_{12} = F or substituted sulfonamide derivatives and s represents 1 to 2

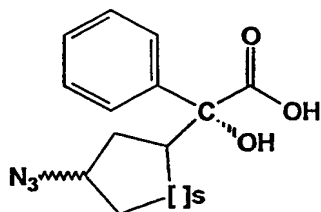
Z represents oxygen, sulphur, NR_{10} , wherein R_{10} represents hydrogen, C_{1-6} alkyl;

Q represents $(CH_2)_n$ wherein n represents 1 to 4, or CHR_8 wherein R_8 represents H, OH, C_{1-6} , alkyl, alkenyl alkoxy or CH_2CHR_9 wherein R_9 represents H, OH, lower alkyl (C_1-C_4) or lower alkoxy (C_1-C_4); and

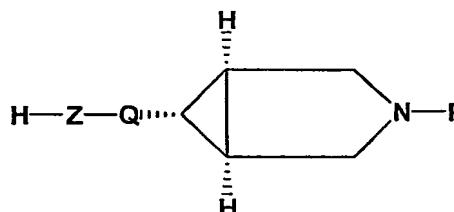
R_4 represents a C_1-C_{15} saturated or unsaturated aliphatic hydrocarbon group in which from 1 to 6 hydrogen atoms may be substituted with the group independently selected from halogen, arylalkyl, arylalkenyl, heteroarylalkyl or heteroarylalkenyl having 1 to 2 hetero atoms selected from a group consisting of nitrogen, oxygen and sulphur atoms with option that any 1 to 3 hydrogen atoms on the ring in said arylalkyl, arylalkenyl, hetero arylalkenyl group may be substituted with lower alkyl (C_1-C_4), lower perhalo alkyl (C_1-C_4), cyano, hydroxyl, nitro, lower alkoxy carbonyl, halogen, lower alkoxy (C_1-C_4), lower perhaloalkoxy (C_1-C_4), unsubstituted

amino, N-lower alkylamino (C_1-C_4), N-lower alkylamino carbonyl (C_1-C_4), comprising

(a) condensing a compound of Formula XIV with a compound of Formula X

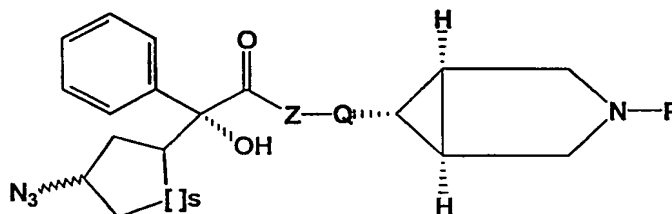


Formula XIV



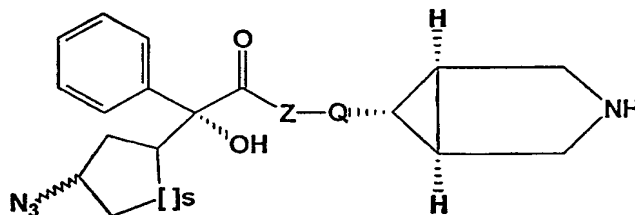
Formula X

where Z, Q, s have the same meanings as defined earlier for Formula IV, to give a protected compound of Formula XV,



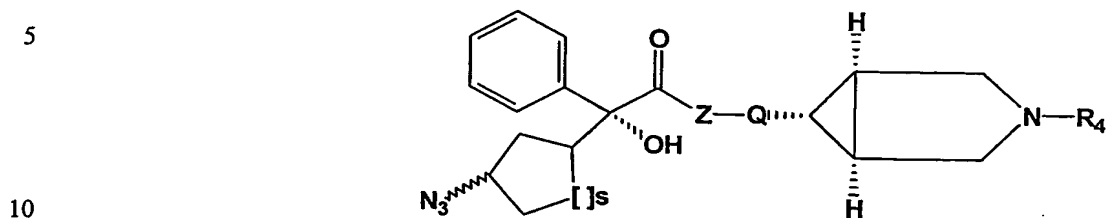
Formula XV

(b) deprotecting the compound of Formula XV in the presence of a deprotecting agent to give an unprotected intermediate of Formula XVI where Z, Q, s have the same meanings as defined earlier,



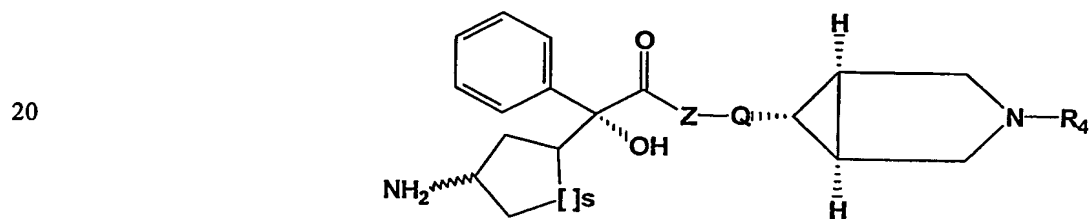
Formula XVI

- (c) the intermediate of Formula XVI is N-alkylated or benzylated with a suitable alkylating or benzylating agent to give a compound of Formula XVI wherein Z, Q, R₄, s are the same as defined earlier,



Formula XVII

- (d) the reduction of a compound of Formula XVII to give a compound of Formula XVIII wherein Z, Q, R₄, s have the same meanings as defined earlier, and



Formula XVIII

- (e) the reaction of a compound of Formula XVIII with acid chlorides to give a compound of Formula IV (R₁₁=H, R₁₂= substituted sulfonamide)
42. The process according to claim 41, wherein P is a protecting group for an amino group and is selected from the group consisting of benzyl or t-butoxy carbonyl groups.
43. The process according to claim 41 wherein the reaction of a compound of Formula XIV with a compound of Formula X to give a compound of Formula XV is carried out in the presence of a condensing agent which is selected from the group consisting of 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDC) and 1,8-diazabicyclo [5.4.0]-undec-7-ene (DBU).

44. The process according to claim 41 wherein the reaction of a compound of Formula XIV with a compound of Formula X to give a compound of Formula XV is carried out in the presence of a suitable solvent selected from the group consisting of N,N-dimethylformamide, dimethylsulphoxide, toluene and xylene.
45. The process according to claim 41 wherein the reaction of a compound of Formula XIV with a compound of Formula X is carried out at about 0-140°C
46. The process according to claim 41 wherein the deprotection of a compound of Formula XV to give a compound of Formula XVI is carried out with a suitable deprotecting agent which is selected from the group consisting of palladium on carbon, trifluoroacetic acid (TFA) and hydrochloric acid.
47. The process according to claim 41 wherein the deprotection of a compound of Formula XV to give a compound of Formula XVI is carried out in a suitable organic solvent selected from the group consisting of methanol, ethanol, tetrahydrofuran and acetonitrile.
48. The process according to claim 41 wherein the N-alkylation or benzylation of a compound of Formula XVI to give a compound of Formula XVII is carried out with a suitable alkylating or benzylating agent, L-R₄, wherein L is any leaving group and R₄ is the same as defined earlier.
49. The process according to claim 48 wherein the leaving group is selected from the group consisting of halogen, O-mestyl and O-tosyl group.
50. The process according to claim 48 wherein the N-alkylation or N-benzylation of a compound of Formula XVI to give a compound of Formula XVII is carried out in a suitable organic solvent selected from the group consisting of N,N-dimethyl formamide, dimethylsulphoxide, tetrahydrofuran and acetonitrile.

51. The process according to claim 41 wherein the reduction of a compound of Formula XVII to give a compound of Formula XVIII is carried out in the presence of a suitable solvent selected from the consisting of tetrahydrofuran and water.
- 5 52. The process according to claim 51 wherein the reduction of a compound of Formula XVII is carried out with triphenylphosphine.
53. The process according to claim 41 wherein the reaction of a compound of Formula XVIII with acid chlorides is carried out in the presence of a suitable solvent selected from the group consisting of dichloromethane, dichloroethane and chloroform.
- 10 54. The process according to claim 53 wherein the acid chloride is selected from the group consisting of phenylacetyl chloride, 4-nitrophenylsulfonyl chloride, benzene sulfonyl chloride, benzyloxyacetyl chloride, 4-methoxyphenylsulfonyl chloride and 4-bromophenylsulfonyl chloride.